

CHAPTER 2:

Pollution Prevention for Printers

What is Pollution Prevention?

This section of the *Workbook* presents pollution prevention information and actual case studies from printers who have reduced their wastes and emissions while improving their bottom line. Traditional methods of handling waste include treatment and disposal, while pollution prevention uses techniques that avoid the generation of waste and SAVE YOU MONEY.

What's in it for me?

More and more printers are finding it's better to prevent the generation of waste; if you don't generate it, there is nothing to treat or dispose. Big benefits to this approach include savings on raw materials, energy, and disposal costs and may include reduced emissions and regulatory requirements. Pollution Prevention (P2) can even increase the quality of your product (see the story of Graphic Printers, presented on page 2-5). By preventing pollution, you prevent waste problems before they can occur, including future liability problems. Case studies of pollution prevention projects that saved printers money are presented in Appendix B.

Pollution prevention generally involves some change; it might mean changing processes that you've used for a long time, or changing a solvent that has worked well for you. However, these changes can save you a lot of money, as well as decrease solvent emissions inside and outside your facility. You may even like the new product better than what you were using (as with Graphic Printers, page 2-5). P2 also includes energy efficiency (which reduces your electric bills) and using raw materials more efficiently, such as reducing solvent loss by decreasing evaporation.

To determine where the P2 opportunities are in your facility, you must first take a good look at your processes (see Appendix B). You may also be able to reduce waste through simple changes such as improved operating procedures or improved housekeeping. The NH Department of Environmental Services' Pollution Prevention Program (NHPPP) has developed a short, hands-on guide to help small businesses identify P2 opportunities at their

facilities. The guide, *Planning for Profits*, leads the reader through a six step process to reduce waste and save money at any type of manufacturing facility, including printing. Call NHPPP at 1-800-273-9469 to obtain a free copy.

Low Hanging Fruit

There are a number of P2 opportunities for printers that are inexpensive, quick and easy to do. Commonly referred to as “low hanging fruit,” these simple projects are easy to implement and can start SAVING YOU MONEY right away. Some low hanging fruit P2 projects for all printers are bulleted below. Since the majority of printers in NH do lithographic, flexographic or screen printing, we have focused on opportunities for their processes. Once you have had success doing these types of projects you may want to investigate tackling a larger P2 project, such as investing in “direct-to-plate” technology to reduce make-ready waste.

One of the best ways any printer can “do P2” is to use solvents that have low vapor pressures. Solvents with vapor pressures of <10 millimeters of mercury are best. Using these types of solvents will reduce solvent evaporation, improve worker health and safety, and save you money from reduced solvent loss. You can work with your vendor for more environmentally friendly products. There are many good alternatives available.

For example, lithographic printers whose cleaning solvents contain toluene, generally have high vapor pressures. Switching to a solvent with less hazardous ingredients and lower vapor pressure (<10 millimeters of mercury) is a quick P2 project that will reduce solvents loss and emissions inside and outside your facility. This type of change may even lower your regulatory requirements.

General P2 Tips for all Printers¹

- Keep solvents in appropriate covered containers to reduce solvent evaporation. Keep all quart size squirt bottles closed when not in use.

1) adapted from the Massachusetts Dept. of Environmental Protection

- Use gravity drainage (as simple as installing a grate in the bottom of the used rags container), wringers or an explosion proof centrifuge to recover solvent from your rags/wipes. Reuse the recovered solvent to clean press parts.
- Use dirty press wash for parts cleaning. Reuse or recycle all solvents to reduce purchase and disposal costs.
- Purchase a solvent distillation unit to significantly reduce solvent purchase and disposal. These units come in all sizes and can have a very quick payback.
- Keep flammable solvents in safety cans.
- Re-use packing material and scrap paper when possible for packaging materials (corner boards are a good example).
- Use silver recovery units to reduce silver concentrations in wastewater.
- Make one person responsible for chemical purchases and inventory control, and use a limited number of vendors.
- Track solvent and ink use and waste generation in order to target areas for waste reduction opportunities. Where can you save the most money?
- Use “first in- first out” management of raw materials to reduce waste from expired chemicals and other raw materials.
- Educate your employees about the importance of waste reduction and the associated cost savings – many employees do not realize how expensive raw materials are to purchase or how expensive waste is to dispose. Do your employees know how much solvent or ink costs? Do they know how much it costs to launder wipes?
- Give employees incentives to reduce waste generation and minimize chemical use. Employees often have good waste reduction ideas.
- Recycle as many items as possible; cardboard, metal, paper and plastic waste, waste negatives, printing plates, etc.

Lithographic Printers

- Use a *blanket wash* with vapor pressure <10 millimeters of mercury. See EPA’s worksheet on Choosing a Better Blanket Wash at:
www.epa.gov/dfe/lithography/bulletins/bullet04/lbulletin4.html.

- Consider using “stay open inks” that do not skin over, allowing them to remain in the press, which decreases solvent use and reduces start up time and labor costs.
- Use alcohol-free fountain solutions (most printers are already doing this).

See the detailed checklist of P2 opportunities for Lithographers on the Printer’s National Environmental Assistance Center’s (PNEAC) website:

http://www.pneac.org/Sheets/litho/p2_cklist_litho.html.

Flexographic Printers

- Purchase correct size sheets and use correct amount of liquid based on film size to minimize use of unexposed photopolymer and save money.
- Consider switching to water washable plates to reduce solvent use.

The following case studies from PNEAC are recommended by the Flexographic Technical Association:

- Reducing Ink and Solvent Use in Enclosed Flexographic Ink Systems
- Management of Aqueous Waste from Water-Based Flexographic Printing Processes
- Environmental Management of Photopolymer Flexographic Printing Plates

These case studies are located at: <http://www.pneac.org/sheets/flexo>.

Screen Printers

- Clean screens while ink is still wet. Avoid delays in cleaning and reclaiming screens in order to reduce the amount of chemicals and labor needed to remove ink, emulsion and haze.
- Try increasing your water dilution for screen cleaning products to reduce chemical use and save money.
- Reuse shop towels to reduce ink remover use.
- Consider switching to water washable plates to reduce solvent purchase and disposal.

The following US EPA case studies and technical information are recommended by the Screenprinting & Graphic Imaging Association International:

- DfE Bulletin 1: Technology Alternatives for Screen Printing (technical information)
- DfE Bulletin 3: Work Practice Alternatives for Screen Reclamation

- DfE Case Study 2: Changing Equipment and Reducing Solvent Use in Screen Reclamation
- DfE Case Study 3: Innovations in Adhesives, Screen Cleaning, and Screen Reclamation.

These case studies can be found on US EPA's Design for the Environment (DfE) website at: <http://www.epa.gov/opptintr/dfe/screenprinting/pubs.htm>.

In addition, SGIA recommends this PNEAC case study:

- Improving on a Good Thing: Romo Reduces TRI Releases

This case study can be found at <http://www.pneac.org/sheets/screen/romo.html>.

NH Printer's Case Study

Printers right here in NH are using P2 techniques to reduce waste, save money, and improve their products. Here is one example of a simple project that saved a lithographic printer time and money.

Saving Money with Stay Open Inks

Graphic Printers is a small sheet fed, offset printing business with only six employees. The company won a 2000 Governor's Award for Pollution Prevention for switching from conventional solvent-based printing inks to "stay open" inks. These types of inks dry via chemical reaction with the paper, instead of solvent evaporation. These inks can be left in the presses for an indefinite period of time, reducing wash-up and loading time and solvent use. Graphic Printers saved an estimated \$5000 in cleanup costs, alone.

Graphic Printers worked with their vendor, F&F Inks of Salem, NH to find and implement the conversion to stay open inks. These inks do not skin over, eliminating this waste stream. By implementing the conversion to "stay open" inks, Graphic Printers reduced their generation of waste ink and waste solvent by approximately 85 percent. Project benefits include reduced ink and solvent consumption, reduced hazardous waste disposal costs for both solvent and ink waste streams, and reduced labor costs. Additional benefits from this project were improved air quality and increased employee morale.

Jesse Kamien of Graphic Printers declares that this is the best drying ink he has ever used. He has used these inks on jobs using work and turn form, double-sided, cut and fold, in less than 2 hours. Mr. Kamien highly recommends these inks. Many ink vendors carry these types of inks.

Source: DES press release, 2000 Governor's Awards

More Information and Technical Assistance

Appendix B is designed to help you do P2 at your facility. Remember, P2 can save you money, help get your company into compliance, and improve the working environment inside your facility. Appendix B contains:

- **A Mini-P2 Guide** to identify P2 projects at your facility **Environmental Cost Accounting** to identify “hidden” costs of waste.
- **Case Studies** to give you real world examples of printers saving money with P2 projects.

The Case studies presented in Appendix B include:

Case Study #	Type of Printing	Topic	Page
1	All	Safer cleaners	B-2
2	ALL	Digital pre-press	B-11
3	All	Silver recovery	B-4
4	Flexo	Water based inks	B-5
5	Litho	Soy based inks	B-6
6	Screen	UV curable inks	B-6
7	Litho	Alcohol free fountain soln.	B-7
8	All	Ink recycling	B-7
9	All	Changing work practices	B-8